MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION

STATUS OF THE FISHERIES

IN MICHIGAN WATERS OF

LAKE ERIE AND LAKE ST. CLAIR

1999

Happy Detroit River walleye anglers

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Highlights for 1999

The purpose of this report is to provide an update on the status of the fisheries in the Great Lakes and connecting waters of southeast Michigan. Sources of information used in compiling this report include creel surveys, charter boat reports, an angler diary program, the Master Angler program, and commercial fishery records, as well as fisheries research studies. Some of the 1999 highlights described in further detail in this report include:

- Lake Erie yellow perch abundance has increased in recent years, but growth has declined.
- Lake Erie walleye experienced good reproduction in 1996, 1997, and 1998 but suffered poor reproduction in 1995.
- Angler effort for the Lake Erie sport fishery increased slightly in 1999, remaining well below the levels observed prior to 1991.
- Lake Erie non-charter catch rates for walleye improved in 1999, while yellow perch catch rates declined.
- Lake Erie charter boat catch rates for walleye were about four times higher than those estimated for non-charter anglers, but yellow perch catch rates were about the same for both groups.
- Charter boat yellow perch catch rates for Lake Erie have more than doubled since 1994.
- Despite the lack of creel survey data for Lake St. Clair, it is apparent that the lake is the premier Michigan water for trophy smallmouth bass and muskellunge.
- The exotic round goby has become a common food item for walleye in Lake St. Clair.
- Ruffe have not yet been collected from Lake St. Clair or Lake Erie.
- Long-term walleye tagging studies on Lake Erie illustrate the important contribution of Lake Erie walleye to the Michigan Great Lakes sport fishery from Port Huron to Toledo.
- Since 1996, a total of 677 lake sturgeon have been tagged and released in Lake St. Clair and the St. Clair River. To date, 18 tag recoveries have been reported.
- Low water levels may restrict angler access to some traditional fishing areas in the connecting waters.

Sport Fishery Summary

An on-site creel survey conducted by the Michigan Department of Natural Resources (MDNR) produced a total harvest estimate of 478,266 fish (Table 1) for Michigan's 1999 Lake Erie sport fishery (non-charter). Estimated angler effort in 1999 increased slightly from 1998 (Figure 1), but remained consistent with the lower level of effort observed since the early 90's. The non-charter walleye catch rate also increased slightly in 1999. We suspect fishing success has not been a major contributing factor to the lower levels of effort since 1991, because catch rates for walleye have remained relatively stable throughout this time period, and yellow perch catch rates in recent years are the highest for the period (Figure 2). Other factors, including weather, fishing success on other Great Lakes waters, and economic conditions have likely contributed to the decreased level of fishing effort.

Biological samples were collected from walleye and yellow perch during the 1999 on-site creel survey. Age 2 and 3 fish (1997 and 1996 year classes) dominated the walleye harvest, comprising 74% of the catch (Figure 3). Harvested age 2 walleye averaged 357 mm (14.0 in.) total length. Age 3 fish (1996 year class) averaged 411 mm (16.2 in.) total length. The contribution from the 1995 walleye year class (age 4) was considerably lower at 16% of the catch.

Yellow perch harvest was dominated by age 3 and 4 fish (1996 and 1995 year-classes), which combined for 80% of the total harvest (Figure 3). Average lengths of harvested age 2, 3, and 4 yellow perch were 179 mm (7.0 in.), 202 mm (7.9 in.), and 215 mm (8.5 in.), respectively. The observed mean length at age for yellow perch taken in the Michigan sport fishery in 1999 remained below the

levels of the mid-1990's, but similar to those of the early 1990's (Figure 4). We suspect that increased abundance in recent years has resulted in slower growth for perch in western Lake Erie.

Since 1989, Michigan charter boat operators have been required to report their charter fishing catch and effort to the MDNR. In 1999, Michigan charter boat anglers harvested 94,293 fish from Lake Erie (Table 2). Walleye (53%) and yellow perch (46%) were the major species harvested, accounting for 99% of the catch. While charter boat walleye catch rates were over four times higher than those estimated for non-charter anglers in 1999, perch catch rates were approximately the same for both groups of anglers.

On Lake St. Clair and the St. Clair River, charter boat anglers harvested 9,398 fish (Table 3). Yellow perch (46%), "other" species (35%), and walleye (18%) made up the bulk of the catch, accounting for about 99% of the total harvest. The "other" species category is thought to consist mainly of smallmouth bass and muskellunge.

During the period since 1990, walleye catch rates have remained relatively high for Lake Erie charter boat anglers (Figure 5), but declined markedly after 1990 for Lake St. Clair charters (Figure 6). In 1999, the charter catch rate for Lake Erie walleye returned to levels typical of the 1990's, after exceeding 1.0 fish per hour in 1998, the highest catch rate observed since the charter boat reporting program started in 1989. The Lake St. Clair walleye catch rate remained about the same in 1999. The relatively stable catch rates for walleye in both water bodies may be a factor in the consistent level of charter excursions on Lake Erie and Lake St. Clair in recent years (Figure 7).

Charter boat catch rates for yellow perch have remained about the same for Lake Erie since 1996, but declined sharply in 1998 and remained low in 1999 for Lake St. Clair (Figures 5 and 6). Strangely, non-charter angler reports for yellow perch fishing during the summers of 1998 and 1999 on Lake St. Clair indicated fishing was very good. Discussions with several Lake St. Clair charter boat captains indicate that the yellow perch charter boat fishery mainly occurs in September and early October. However, charter boat captains found that the fishery was very late to develop in 1998 and 1999, with the best fishing occurring in late October and November, after most charter businesses had closed for the season.

Despite the lack of creel survey data for Lake St. Clair, it is apparent that the muskellunge fishery exceeds that of any other period in modern history. Angler reports indicate that catch rates in the 1990's are spectacular. Muskellunge catch rates derived from the Angler Diary Program on Lake St. Clair verify these reports (Figure 8). We believe that the quality of the Lake St. Clair muskellunge fishery is also reflected in the MDNR's Master Angler Program. The total number of muskellunge from Lake St. Clair entered for Master Angler Awards in 1999 was the highest since at least 1986 (Figure 9). The number of fish over 30 pounds remained well above the numbers recorded prior to 1992. We believe that factors contributing to the dramatic improvement in this fishery include: 1) a positive response to increased minimum size limits on both sides of the lake since the mid-1980's; 2) physical and biological changes in the lake such as clearer water and increased aquatic plant growth resulting in improved habitat for Great Lakes muskellunge; and, 3) increased voluntary catch and release fishing for muskies in Lake St. Clair by both sport and charter anglers.

The Master Angler program also indicates that Lake St. Clair is the premier waterbody in the state for trophy smallmouth bass. Lake St. Clair accounted for better than 26% of all smallmouth bass entries in 1999 (catch/keep and catch/release programs combined). Fifteen of the 33 catch and keep entries, 45% of the total, for 1999 were from Lake St. Clair. The high proportion of catch and keep entries may be related to the popular smallmouth bass charter fishery on the lake.

Commercial Fishery Summary

State licensed commercial seine operations in the shallow embayments along Michigan's Lake Erie shoreline harvested 8 species of fish for a total of 259,993 pounds (Table 4), a 63% decline from the total harvest of 721,580 pounds in 1998. In combination, common carp (81%), buffalo (10%) and channel catfish (3%) accounted for 94% of the total harvest by weight. The total value of the 1999 Lake Erie commercial harvest from Michigan waters was estimated at $51,925.

Summary of Netting Surveys

The Michigan waters of the western basin of Lake Erie have been monitored with spring trap net surveys since 1978. In 1999, total catch per net lift (CPUE) for all species combined was the highest since 1991, well above the average for the 1990's (Table 5). Smallmouth bass, rock bass, white bass, white perch, channel catfish, redhorse suckers, freshwater drum, common carp, and quillback exhibited CPUE values above the 22 year mean CPUE. Walleye CPUE was similar to that for the past six years, but remained below the 22 year average. Yellow perch CPUE was the highest since 1991. However, comparison of yellow perch mean CPUE for the 1978-89 period (254.6/lift) with the 1990-99 period (41.5/lift) clearly illustrates the dramatic change in yellow perch catches at the spring trap net sites. This change is likely the result of a substantial decline in yellow perch abundance since 1990. In addition, we also suspect increased net avoidance due to improved water clarity has contributed to low total CPUE since 1990.

Age 3 walleye (1996 year class) accounted for 50% of the trap net walleye catch in 1999 (Figure 10). The 1997 and 1994 year classes were also well represented, accounting for 24% and 6% of the total catch respectively. Conversely, the weak 1995 (age 4) and 1992 (age 7) year classes were very poorly represented in the trap net catch in 1999. Based on mean length at age, no trend is evident for Lake Erie walleye growth rates. A total of 1,630 walleye captured in the trap nets were tagged and released as part of the ongoing interagency tagging project.

In 1999, age 5 (1994 year class) yellow perch were the most abundant year class in the trap net yellow perch catch, accounting for 40% of the total catch (Figure 11). The 1995 and 1996 year classes (age 5 and age 4, respectively) were also well represented, contributing 48% of the total catch. Age specific catch rates for yellow perch from the trap nets, suggest that these three year classes (1994, 1995, and 1996) are the strongest yellow perch year classes since the late 1980's. Growth for yellow perch of most ages has apparently slowed again, after a period of several years in the early and mid-1990's of improving growth rates (Figure 12). This most recent slow down may be a result of increased yellow perch abundance and competition for food resources.

Since 1978, the MDNR has fished variable mesh multi-filament gill nets at two locations in western Lake Erie each fall, as part of the interagency yearling walleye assessment program. During 1999, a total of 795 walleye were caught in eight net lifts. The total walleye catch-per-effort for the index sites declined in 1999 (Table 6). The age 1 catch rate of 26.0 suggests that the 1998 year class is average. The 1996 year class , which accounted for 55% of the total catch in 1997 and 56% of the total catch in 1998 is clearly the strongest cohort in the population at this time, and probably the strongest since the 1986 year class. The very low catch rates for the 1995 and 1992 year classes illustrate the weakness of those two cohorts. No trend in walleye growth is obvious from the mean length at age data for walleye taken in the fall index gill net survey.

The fish community of Lake St. Clair was surveyed with bottom trawls in 1999 by the MDNR. Over 200 trawl tows were conducted at locations randomly selected across the lake. The diversity of the Lake St. Clair fish community was obvious during the sampling, with 45 fish species represented among the total of 35,763 fish collected. The most abundant species were yellow perch, spottail shiner, trout-

perch, smallmouth bass, rock bass, and mimic shiner (Figure 13). Abundant forage species provide a healthy forage base for the lake's predator populations, including smallmouth bass, walleye, northern pike, and muskellunge. For example, Lake St. Clair walleye stomachs examined in 1999 contained mayflies and at least six different species of forage fish (Figure 14). Interestingly, the exotic round goby, which is now abundant throughout the lake, was found in 30% of the non-empty walleye stomachs. While the impact of the round goby on the native fish community of the lake is unclear at this time, the densities of johnny darter and logperch have declined steadily since 1996 (Figure 15). This decline could be a result of competitive interactions with the exotic round goby. At the present, the exotic tubenose goby remains uncommon, and no ruffe have been collected from Lake St. Clair.

A total of 172 lake sturgeon were collected during assessment surveys on the St. Clair River and Lake St. Clair in 1999. All were released back into these waters. Sturgeon captured in 1999 averaged 47.0 inches in total length, with a range from 10 inches to 72 inches. A total of 168 sturgeon were aged with pectoral fin ray sections. Forty year-classes were represented with ages ranging from 1 to 62 years. Combined age samples from 1997-1999 indicate that survival of lake sturgeon spawned in the 1970's and 1980's has been consistent and higher than that of the 1960's (Figure 16). This may be a result of improved water quality after the Clean Water Act of 1972 or could be related to more restrictive lake sturgeon sport fishing regulations implemented in 1983. A total of 167 sturgeon were tagged on the dorsal fin with numbered metal tags and released.

Fish Tagging Studies

In 1999, a total of 2,716 walleye were tagged by New York and Michigan at 2 Lake Erie sites. Sixty-three of those tags were recovered by fishermen for a single season reporting rate of 2.3%. The 1999 site-specific reporting rate varied from a high of 2.6% at the Van Buren Bay site in New York, to a low of 2.1% for the Raisin River tag site in Michigan. The interagency tagging study continues to provide evidence of substantial movement of walleye from spawning locations in Lake Erie through the St. Clair connecting waters (Figure 17).

A total of 677 lake sturgeon have been tagged and released on the St. Clair River and Lake St. Clair since 1996. To date, eighteen tagged lake sturgeon have been recaptured. Seventeen were originally caught with setlines, tagged, and released in the North Channel of the St. Clair River. Seven have been recovered with survey setlines in the North Channel. Seven recoveries were reported in 1998 and 1999 by sport anglers in the North Channel. Four recoveries have been reported from the Ontario commercial trap-net fishery in southern Lake Huron, approximately 70 kilometers from the tag site. All other recaptures have occurred within 10 km of the tag sites. Although trawling has accounted for 56% of the 677 sturgeon tagged and released during this study, only one recovery, 5% of the total, has been from a fish originally caught in a trawl on Lake St. Clair. This may be an indication that fish that reside year around in the St. Clair River or move north into southern Lake Huron experience a much higher level of fishing exploitation.

Water Levels

After nearly 30 years of above average water levels, anglers have seen water levels in the connecting waters and Lake Erie drop below average during the last two years. Lower water levels may prove an impediment to sport anglers by restricting boat launching and boat travel to some traditional fishing areas due to shallow water depths. The effect of lower water levels on fish populations is uncertain. Short-term impacts may be negative. For example, northern pike spawning may be negatively impacted because coastal wetlands are dewatered. Bass spawning beds could also be more visible and more vulnerable to "preseason" catch and release bass fishing.

However, if water levels remain low for 3-10 years, coastal wetlands would be expected to expand. If water levels then return to average or above average, increased coastal wetlands habitat would positively impact many of the fish species in the connecting waters.

Sport Fishing Regulations

Fisheries biologists with the Ontario Ministry of Natural Resources (OMNR) are concerned about the status of the walleye spawning stock in the Thames River, the major walleye spawning site for Lake St. Clair. As a result, the OMNR implemented a new 18 inch maximum size limit for walleye in Ontario waters of Lake St. Clair and the St. Clair River in 2000. This regulation remains in effect indefinitely. The Michigan DNR did not recommend or implement this regulation for the Michigan portion of these water bodies. We believe the extensive movements of walleye throughout this system, combined with an absence of evidence for excessive exploitation, prevent such a radical regulation change. Michigan will continue to enforce a 13 inch minimum size limit for these waters. We also recommend no change in the present daily bag limit of six walleye for Lake St. Clair and the St. Clair River.

Walleye in Lake Erie are managed cooperatively with other jurisdictions under a harvest quota system. Michigan's sport fishery has consistently harvested below the quota since 1991. This underutilization of the available resource appears to be mainly a result of reduced fishing effort in Michigan waters. Therefore, the daily walleye bag limit in Michigan's waters of Lake Erie will once again include the statewide 5 fish daily limit and an additional 5 fish, for a total daily limit of 10 fish per day for 1999. If harvest exceeds the harvest quota in the future, the daily bag limit will be adjusted downward.

Lake sturgeon fishing regulations were revised by the MDNR in 1999. Effective, April 1, 1999, harvest of lake sturgeon is prohibited from Michigan's Great Lakes and connecting waters, except for the St. Clair River and Lake St. Clair. On the St. Clair River and Lake St. Clair, regulations include a "slot" size limit, with a minimum length limit of 1,067 mm (42 inches) and a maximum length limit of 1,270 mm (50 inches), a season bag limit of 1 fish, an open season from July 16 to September 30, and mandatory registration of harvested sturgeon at designated check stations. This "slot" limit will allow a limited harvest to continue, while protecting sexually mature female fish, and potentially allowing older fish to increase in abundance. No lake sturgeon were registered at the check stations during the 1999 harvest season.

The open season for smallmouth bass fishing on the connecting waters (St. Clair River, Lake St. Clair, and Detroit River) is from the last Saturday in June to December 31. In recent years, "preseason" fishing for bass has become increasingly popular on these waters. Many anglers are apparently unaware that it is a violation of the Natural Resources and Environmental Protection Act to fish for smallmouth bass during the closed season (Public Act 451 of 1994, Part 487, Sec. 324.48716), even if the angler intends to release any bass caught. The objective of the season closure is to protect bass during the pre-spawning and spawning periods when they can be particularly vulnerable to overexploitation. This year, in particular, low water levels could make spawning bass more visible and thus more vulnerable in Lake St. Clair. We urge bass anglers to show restraint and comply with the existing fishing regulations on the connecting waters.

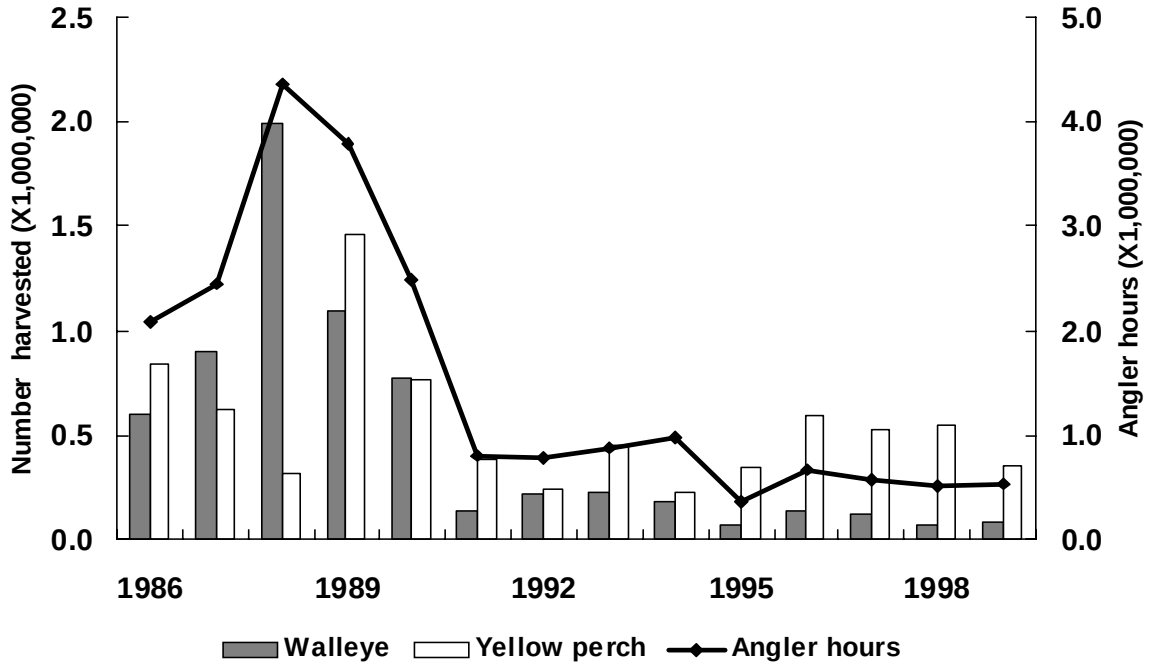


Figure 1.—Estimated harvest and effort for Michigan's Lake Erie sport fishery, 1986-1999.

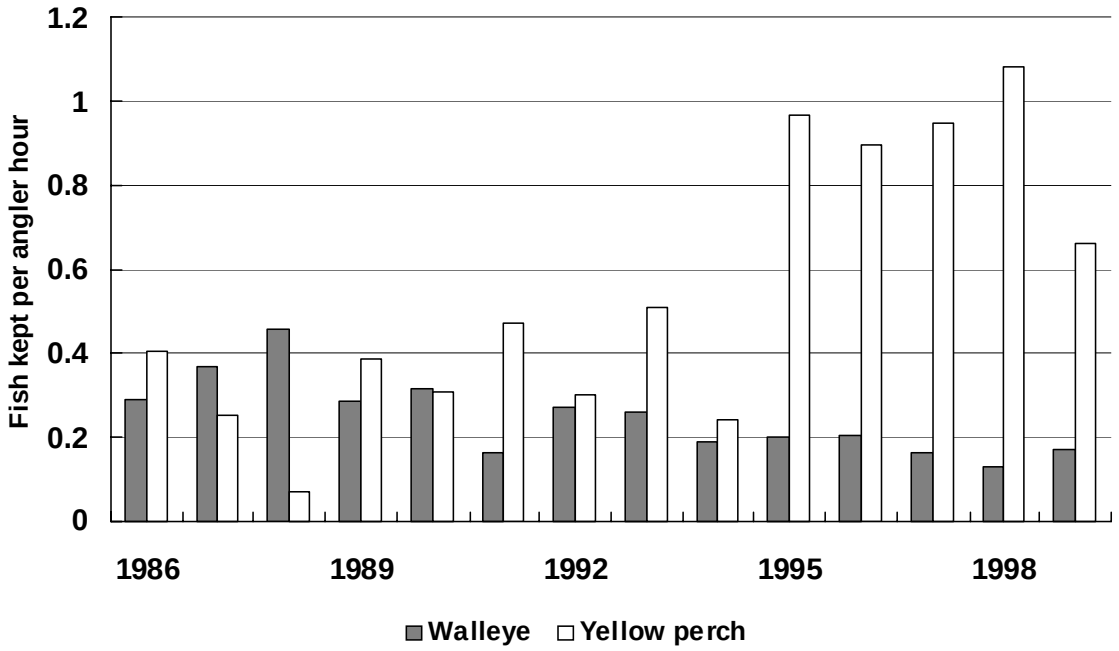
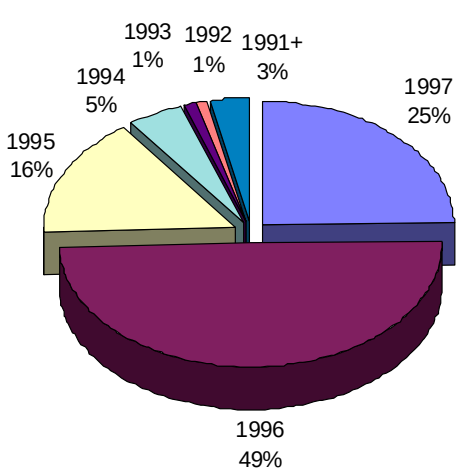
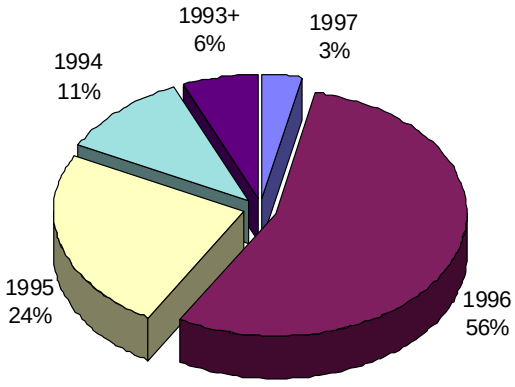


Figure 2.—Walleye and yellow perch catch per effort for Michigan's Lake Erie sport fishery, 1986-1999.



Walleye



Yellow Perch

Figure 3. —Year-class contribution to Michigan sport harvest for walleye and yellow perch from Lake Erie in 1999.

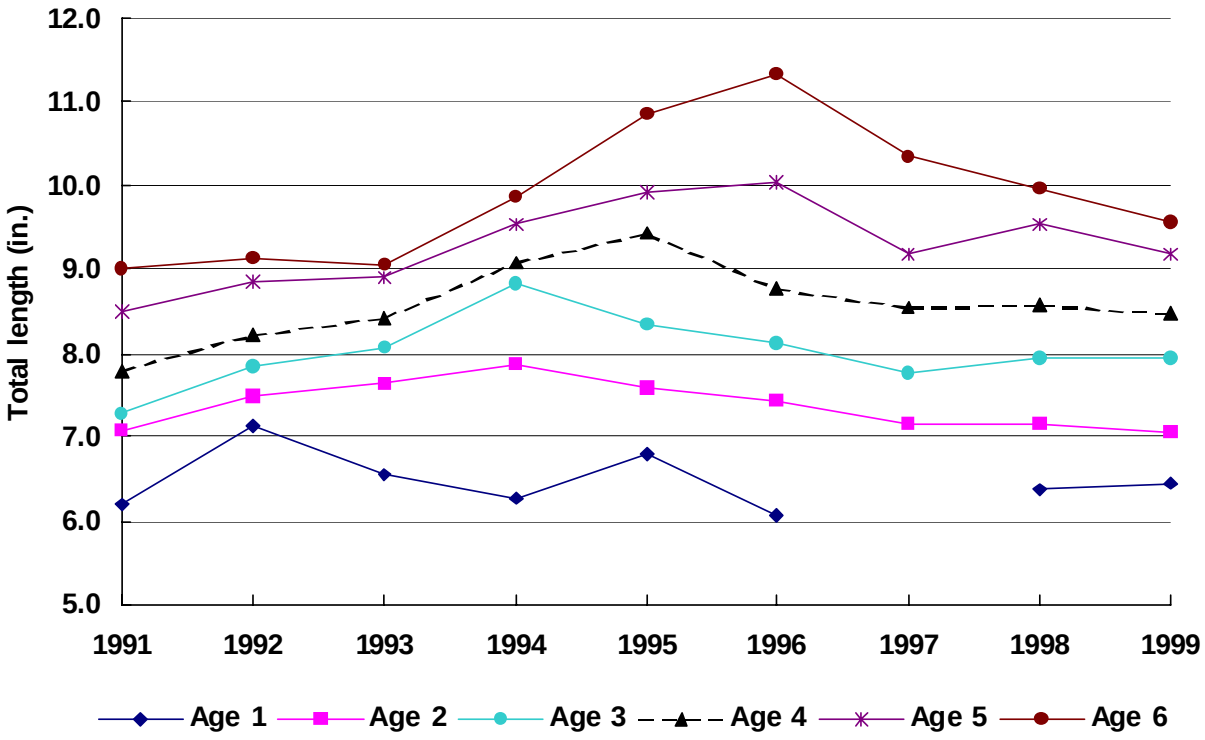


Figure 4. —Mean length at age for sport caught yellow perch from Michigan's waters of Lake Erie, 1991-1999.

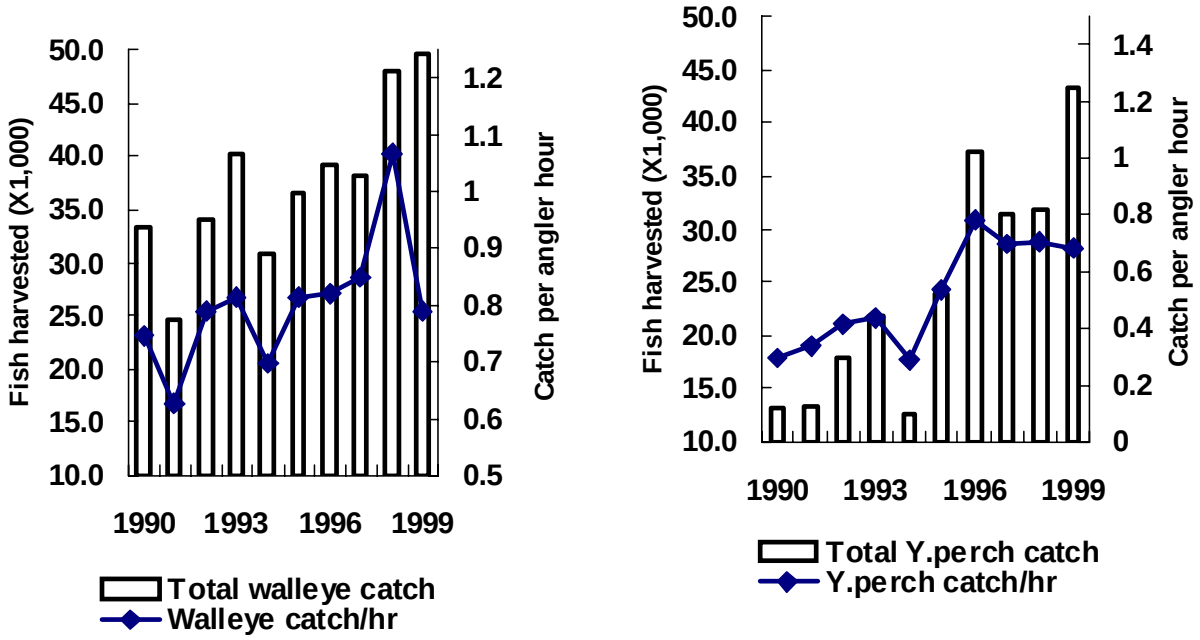


Figure 5. —Michigan charter boat harvest and catch rates for Lake Erie, 1990-1999.

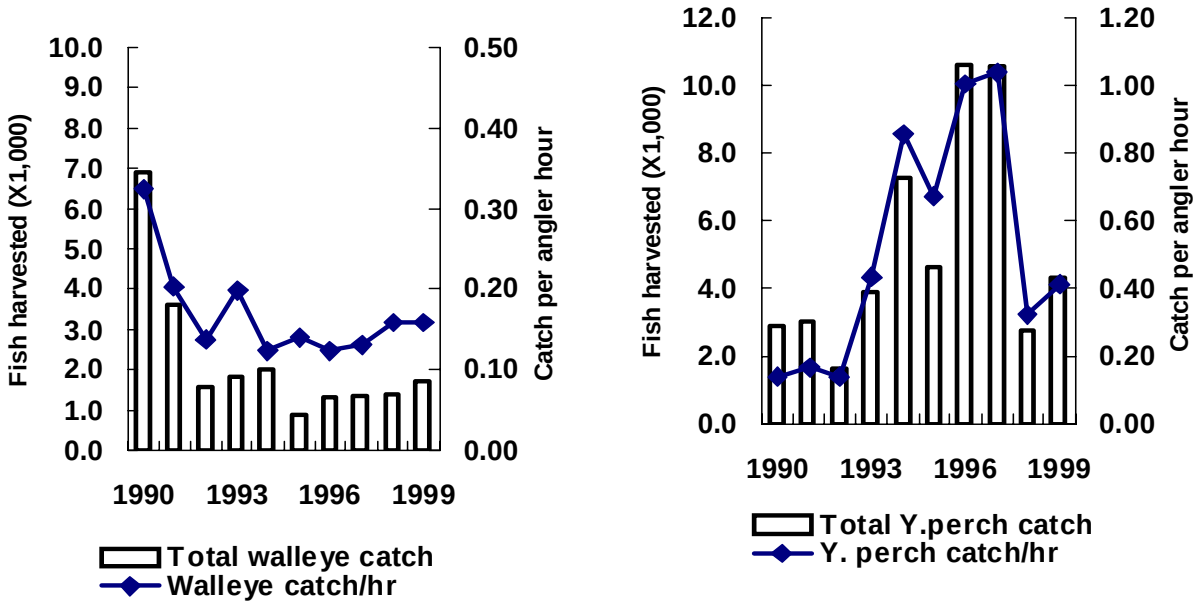


Figure 6. —Michigan charter boat harvest and catch rates for Lake St. Clair, 1990-1999.

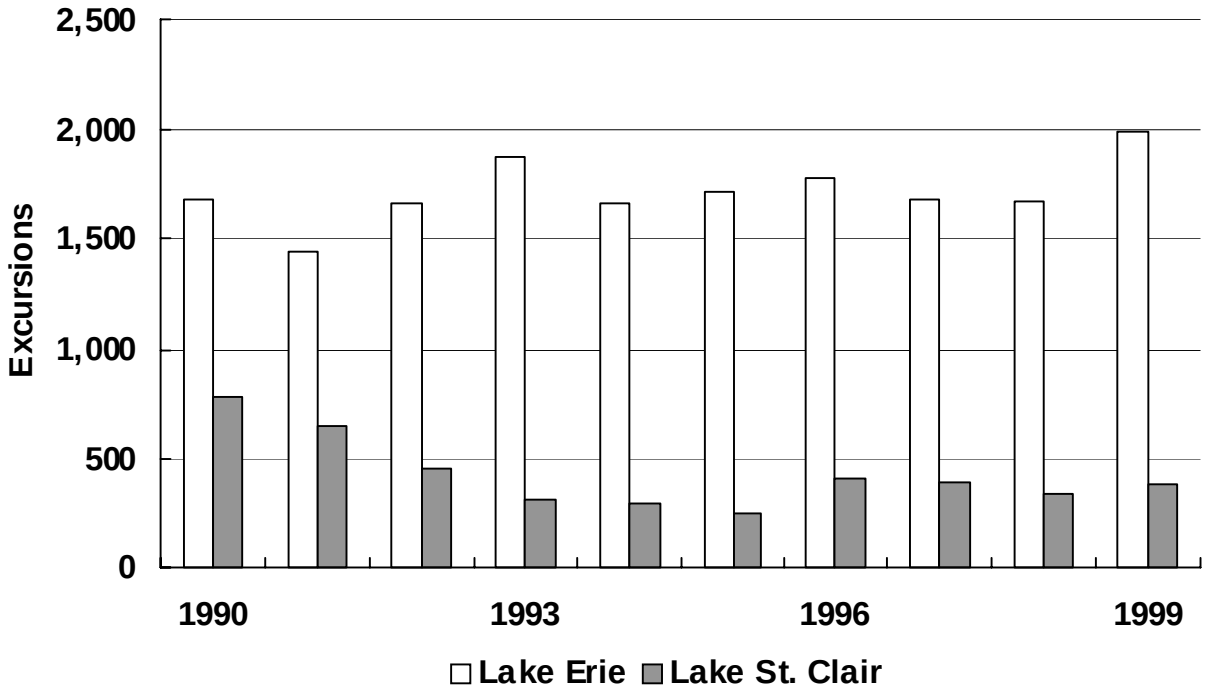


Figure 7. —Reported charter boat excursions on Lake Erie and Lake St. Clair, 1990-99.

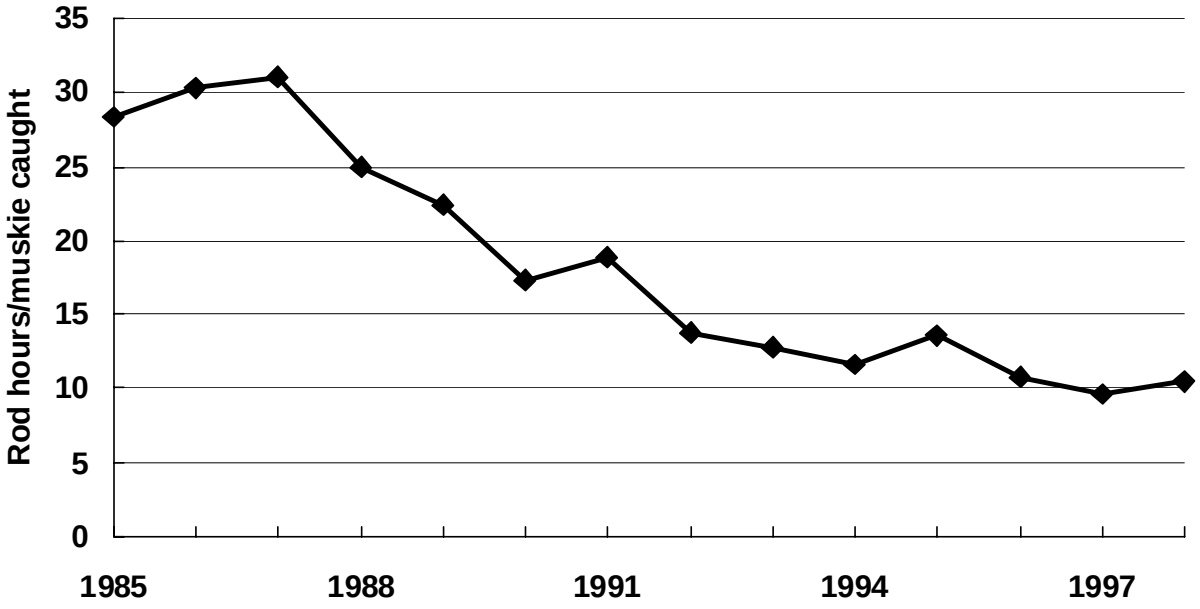


Figure 8. —Lake St. Clair great lakes muskellunge catch rate from Angler Diary Program, 1985-98.

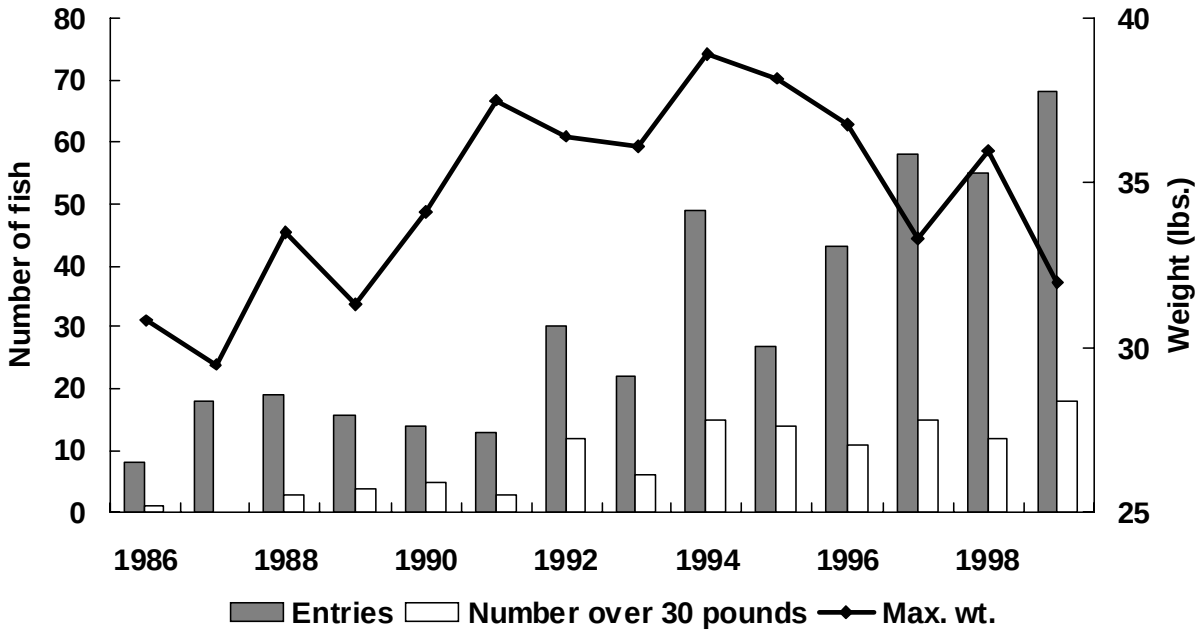


Figure 9. —Lake St. Clair great lakes muskellunge entered in the Michigan DNR Master Angler Program, 1986-1999. Values for 1992-99 represent combined regular and catch-and-release Master Angler categories.

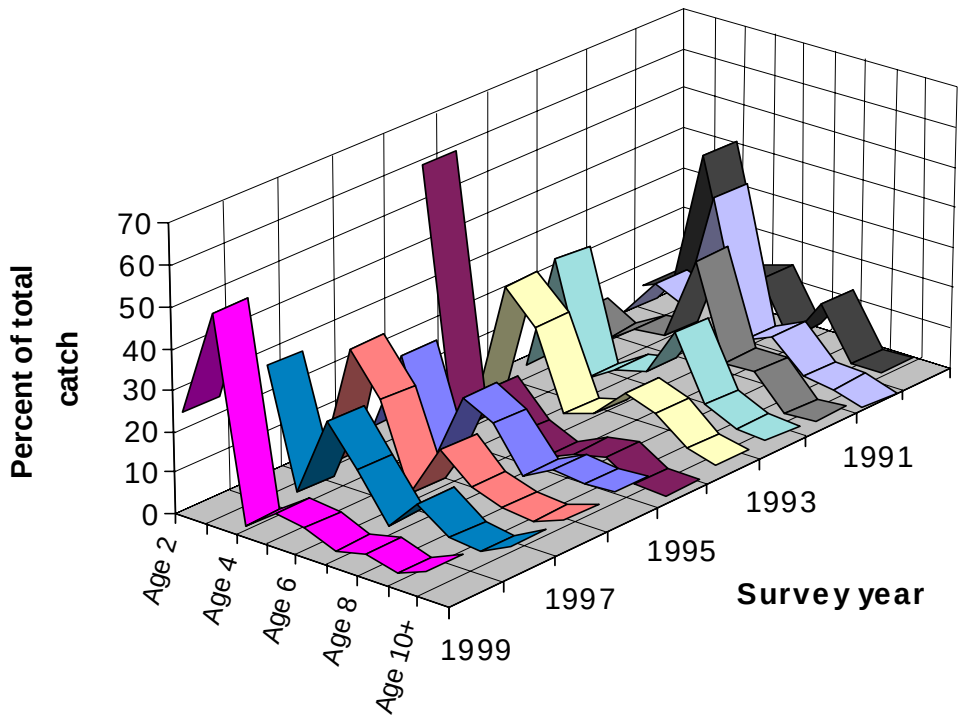


Figure 10. —Age composition of walleye from survey trap nets on Lake Erie, 1990-1999.

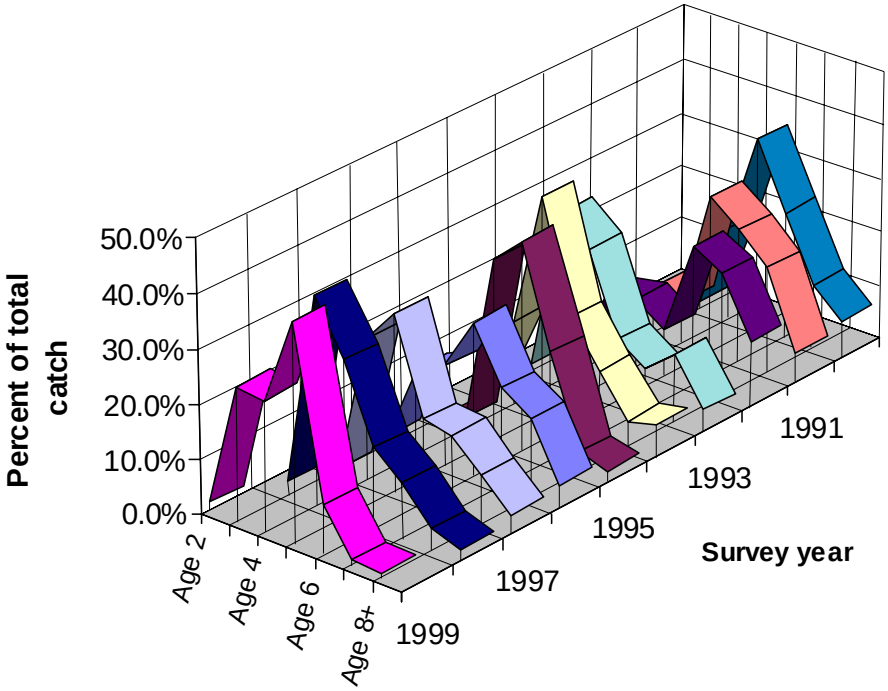


Figure 11. —Age composition of yellow perch from survey trap nets on Lake Erie, 1990-1999.

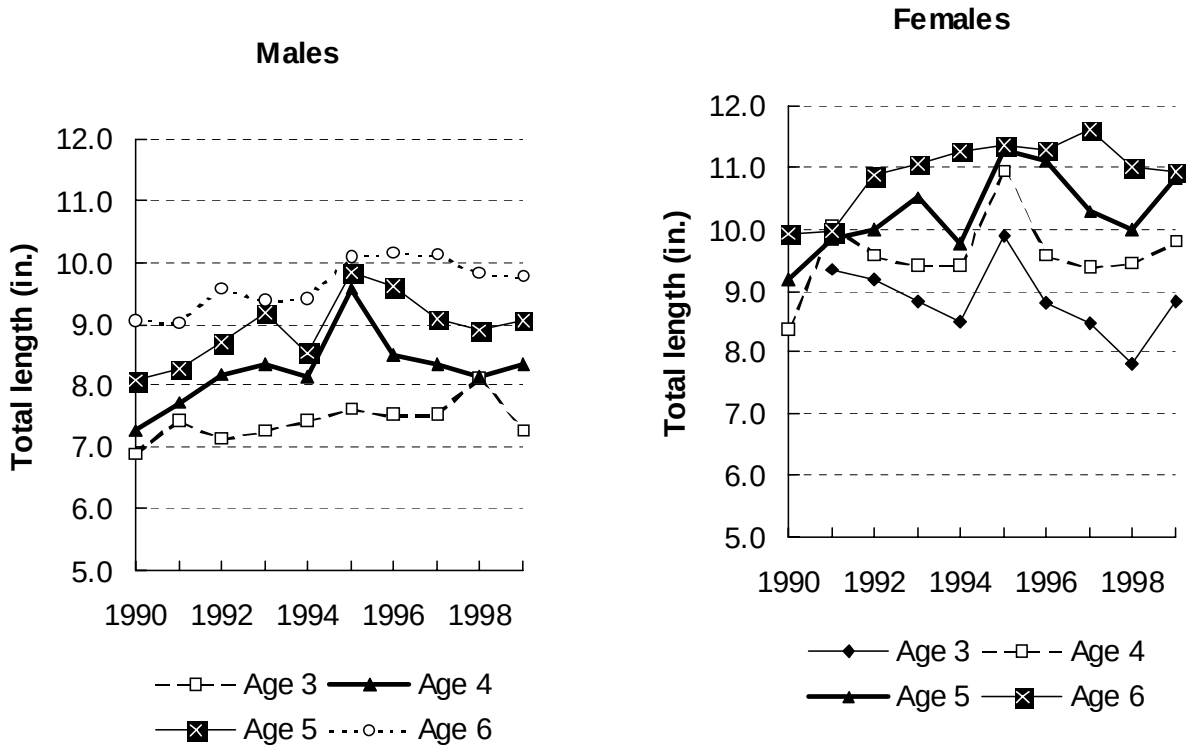


Figure 12. —Mean length-at-age for yellow perch from index trap nets, Lake Erie, 1990-99.

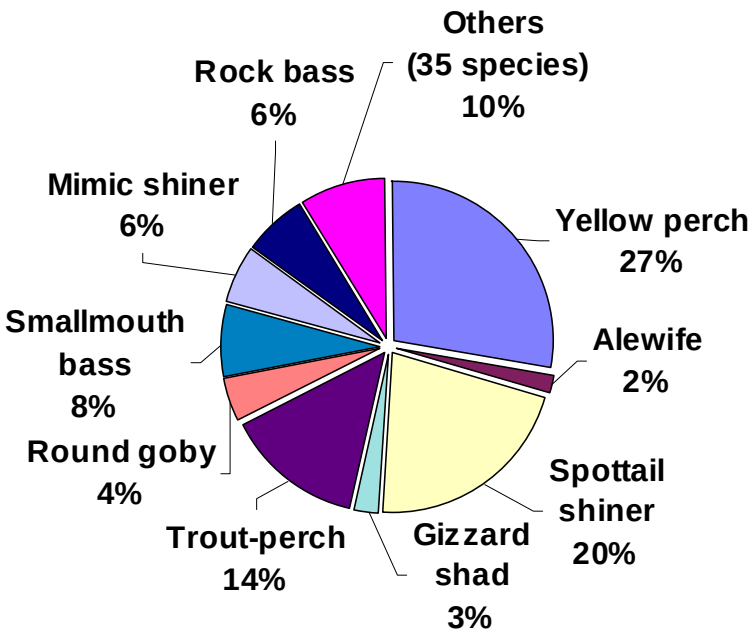


Figure 13. —Catch composition for all trawls on Lake St. Clair in 1999.

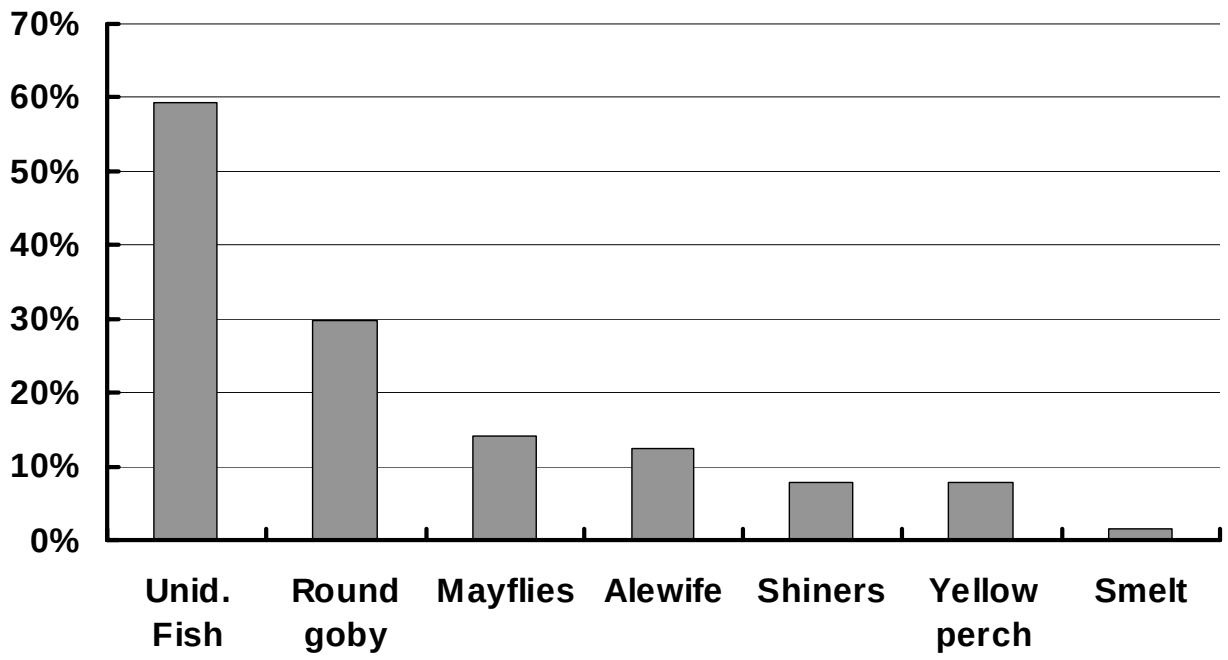


Figure 14. —Frequency of occurrence of various prey taxa in non-empty Lake St. Clair walleye stomachs examined in 1999 (n=64).

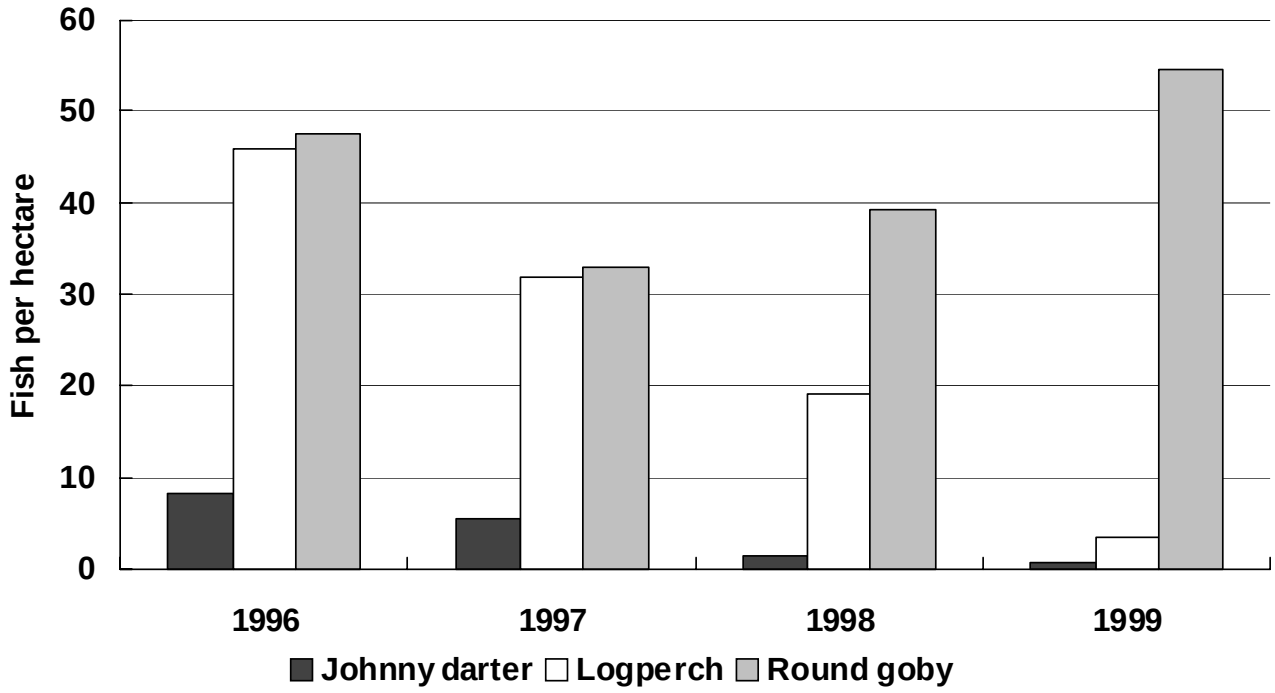
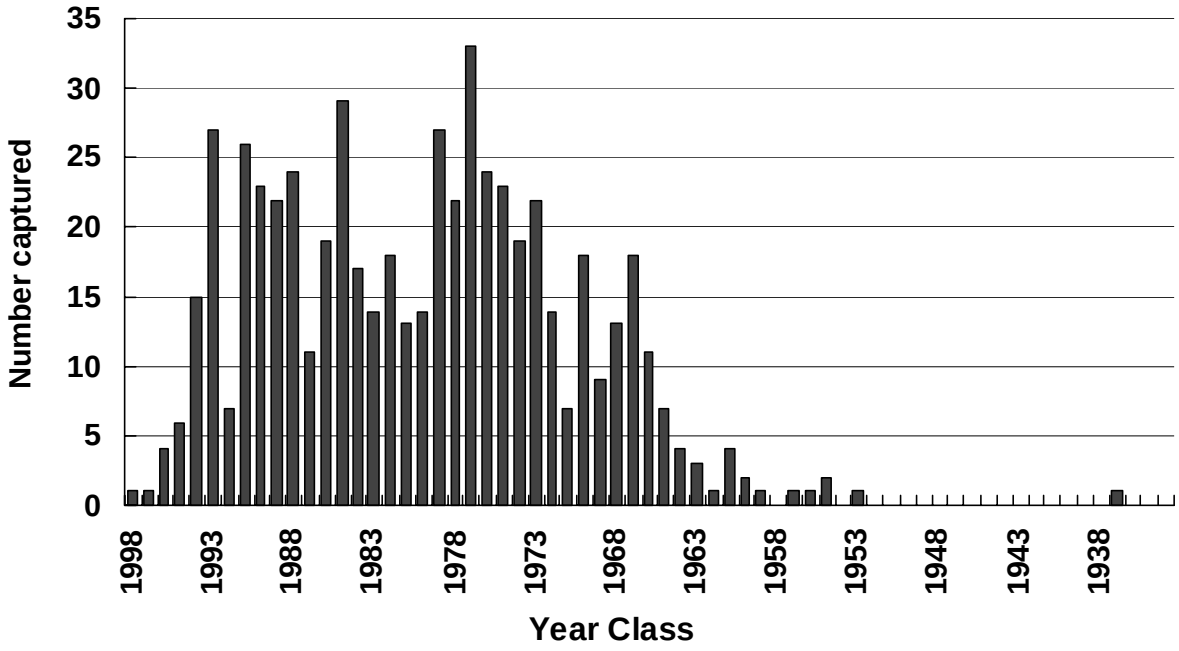

60
50
40
30
20
10
0
Fish per hectare
1996
1997
1998
1999
Johnny darter
Logperch
Round goby

Figure 15. —Density of johnny darter, logperch, and round goby in Lake St. Clair, based on mean trawl



catch rates.

Figure 16. —Year of hatching for lake sturgeon sampled from Lake St. Clair and St. Clair River from 1997 to 1999 by Mt. Clemens Research Station.

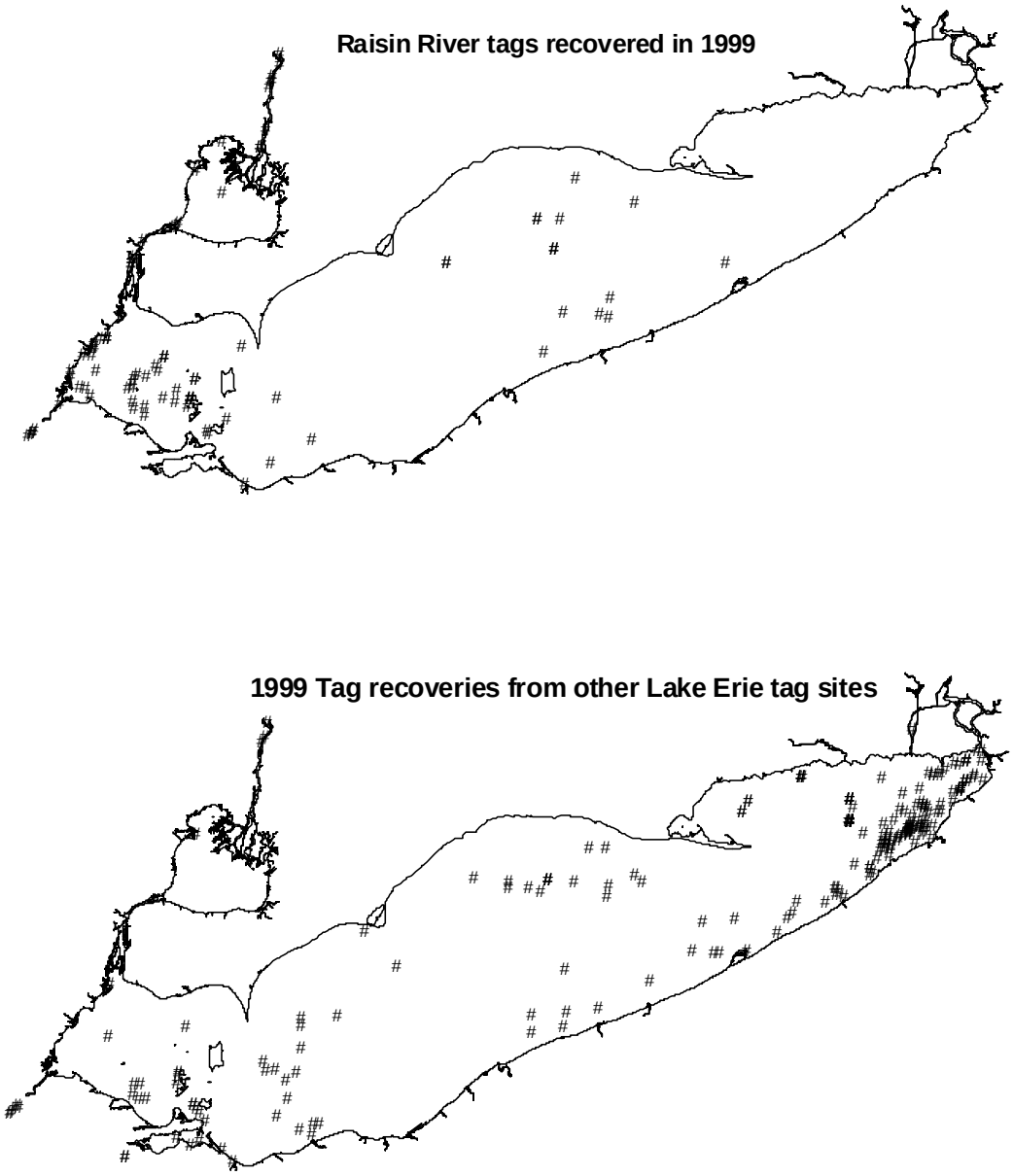


Figure 17. —Geographical distribution of walleye tag recoveries in 1999 from fish tagged during all years at Monroe (91 recoveries in 1999) and other Lake Erie tag sites (230 recoveries in 1999).

Table 1. —Estimated sport harvest, catch rate, and effort for Michigan's 1999 Lake Erie non-charter boat fishery. Two standard errors in parentheses.

		Month							
Species	Harvest per hour	Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Yellow perch	0.6642	39	3,998	7,240	32,491	99,974	164,936	45,167	353,845
	(0.2554)	(123)	(6,111)	(12,069)	(61,121)	(71,113)	(82,669)	(31,107)	(129,528)
Walleye	0.1699	118	16,189	37,721	32,172	3,715	511	116	90,542
	(0.0632)	(210)	(9,485)	(23,156)	(19,181)	(4,923)	(1,094)	(413)	(31,933)
Channel catfish	0.0293	254	176	4,893	3,919	230	5,260	872	15,604
	(0.0384)	(573)	(365)	(10,185)	(12,052)	(902)	(12,701)	(1,664)	(20,356)
White bass	0.0166	373	2,886	1,038	2,400	1,427	678	61	8,863
	(0.0246)	(1,079)	(4,500)	(2,593)	(8,620)	(7,837)	(2,697)	(243)	(13,084)
Freshwater drum	0.0082	23	590	2,044	644	1,017	33	12	4,363
	(0.0189)	(111)	(2,549)	(7,721)	(4,254)	(4,077)	(207)	(69)	(10,044)
White perch	0.0035	0	242	169	112	60	1,145	132	1,860
	(0.0102)	(0)	(903)	(772)	(378)	(378)	(5,244)	(544)	(5,431)
Bluegill	0.0025	5	0	0	0	1,079	250	0	1,334
	(0.0147)	(34)	(0)	(0)	(0)	(7,686)	(1,563)	(0)	(7,843)
Smallmouth bass	0.0012	0	0	199	100	100	217	0	616
	(0.0027)	(0)	(0)	(667)	(412)	(387)	(1,112)	(0)	(1,414)
Black crappie	0.0012	11	21	0	0	0	0	581	613
	(0.0044)	(67)	(104)	(0)	(0)	(0)	(0)	(2,363)	(2,367)
Largemouth bass	0.0007	0	0	155	235	0	0	0	390
	(0.0026)	(0)	(0)	(814)	(1,142)	(0)	(0)	(0)	(1,402)
Muskellunge	0.0002	0	0	0	91	0	0	0	91
	(0.0012)	(0)	(0)	(0)	(634)	(0)	(0)	(0)	(634)
Rainbow trout	0.0001	0	0	64	10	0	0	0	74
	(0.0006)	(0)	(0)	(334)	(67)	(0)	(0)	(0)	(340)
Rock bass	0.0001	0	20	0	0	0	0	18	38
	(0.0003)	(0)	(95)	(0)	(0)	(0)	(0)	(103)	(140)
Lake trout	0.0001	0	0	0	33	0	0	0	33
	(0.0004)	(0)	(0)	(0)	(240)	(0)	(0)	(0)	(240)
Angler hours		6,317	71,373	152,442	118,817	74,805	87,270	21,738	532,762
		(4,310)	(27,888)	(36,168)	(29,667)	(20,098)	(21,878)	(8,761)	(62,800)
Angler trips		1,381	13,503	29,619	20,588	15,181	17,107	4,669	102,048
		(941)	(5,175)	(6,775)	(5,280)	(4,109)	(4,389)	(1,942)	(11,889)
Angler days		1,366	13,277	29,345	20,181	14,986	16,986	4,669	100,810
		(935)	(5,120)	(6,691)	(5,226)	(4,031)	(4,353)	(1,942)	(11,753)

Table 2. —Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Erie, 1999.

Species	Total catch per hour	Total catch per excursion	Month							
			Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0.000	0.001	0	0	5	0	0	0	0	5
Chinook salmon	0.000	0.001	0	0	0	0	0	0	0	0
Rainbow trout	0.000	0.010	0	1	6	0	0	0	0	7
Yellow perch	0.686	21.678	47	270	723	2,408	18,951	16,509	4,274	43,182
Walleye	0.790	24.963	82	5,637	29,111	13,624	268	1,003	1	49,726
Other	0.022	0.689	0	376	672	250	10	41	24	1,373
Angler hours			255	7,405	29,796	16,459	3,899	4,320	815	62,949
Angler trips			36	1,294	4,498	2,995	739	854	160	10,576
Anglers										
Resident			28	1,115	3,965	2,707	692	802	150	9,459
Nonresident			8	179	539	288	47	52	10	1,123
Charter excursions			11	267	905	450	153	174	32	1,992

Table 3. —Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake St. Clair and the St. Clair River, 1999

Species	Total catch per hour	Total catch per excursion	Month							
			Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0.001	0.018	0	0	0	0	0	0	0	0
Chinook salmon	0.000	0.009	0	0	0	0	0	0	0	0
Yellow perch	0.413	11.172	50	575	576	815	748	802	780	4,346
Walleye	0.163	4.419	280	288	489	420	206	36	0	1,719
Other	0.317	8.568	50	262	832	998	1,012	173	6	3,333
Angler hours			681	1,059	2,087	2,464	2,331	1,563	341	10,526
Angler trips			99	162	326	380	349	221	54	1,591
Anglers										
Resident			66	162	323	339	330	212	52	1,484
Nonresident			33	0	3	41	19	9	2	107
Charter excursions			30	46	76	89	81	53	14	389

Table 4. —Commercial harvest from Michigan waters of Lake Erie in 1999.

	Carp	Buffalo	Channel catfish	Bullhead	Gizzard Shad	Other[1]	Total
Harvest (lbs.)	211,055	25,894	7,561	7,050	6,200	2,233	259,993
% of total	81	10	3	3	2	<1	100
Economic value	$31,658	$12,515	$4,536	$1,939	$930	$347	$51,925

[1] Others category includes sucker, freshwater drum, and white bass

Table 5. —Mean catch per trap net lift for all species commonly taken during spring trap net surveys in Michigan waters of Lake Erie.

	Survey year											
Species	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Walleye	28.1	49.0	18.1	20.6	38.8	26.1	36.6	75.5	61.7	33.9	83.1	35.9
Smallmouth bass	0.1	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.3
Yellow perch	377.0	320.0	669.0	512.0	146.0	257.0	129.0	156.0	40.3	174.0	22.9	251.5
Rock bass	1.2	0.8	1.9	0.9	1.5	1.3	1.0	1.5	0.7	1.5	0.9	0.8
White bass	1.5	1.5	3.7	1.4	10.5	4.9	2.5	2.8	7.6	0.4	5.3	4.7
White perch	0.0	0.1	0.3	0.5	24.6	35.0	10.9	38.9	30.3	43.5	63.1	233.0
Pumpkinseed	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1
Bluegill	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Black crappie	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.1	0.2	0.2	0.4	0.2
Channel catfish	3.5	9.7	5.4	5.8	4.9	10.6	4.6	5.5	5.4	2.7	3.5	4.1
Brown bullhead	0.2	1.1	1.6	1.9	1.7	4.2	2.5	1.5	4.1	0.9	9.2	3.9
White sucker	7.8	8.3	7.9	12.2	8.7	6.7	10.2	33.0	10.2	7.0	6.7	2.8
Redhorse sp.	2.4	1.2	0.6	1.0	0.8	1.5	1.7	1.4	1.3	1.7	1.8	0.6
Freshwater drum	37.4	66.8	14.0	42.9	13.4	23.5	25.1	30.6	25.3	9.1	15.6	6.4
Common carp	5.1	26.1	4.7	8.2	6.9	14.9	3.5	2.0	1.9	0.6	6.0	0.6
Goldfish	4.8	2.4	0.3	0.4	0.4	2.5	0.6	0.2	0.1	0.0	0.2	0.1
Gizzard shad	4.4	4.7	2.3	3.9	17.8	28.4	18.1	17.4	2.7	2.3	15.9	0.3
Longnose gar	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Bowfin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Quillback	4.0	18.6	1.8	2.0	2.4	5.6	2.0	1.9	1.7	1.8	1.5	0.7
Stonecat	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Total	477.9	510.3	731.8	613.9	278.8	422.4	248.7	368.5	193.6	279.7	236.4	546.2
% yellow perch	78.9	62.7	91.4	83.4	52.4	60.8	51.9	42.3	20.8	62.2	9.7	46.0
% white perch	0.0	0.0	0.0	0.1	8.8	8.3	4.4	10.6	15.7	15.6	26.7	42.7
Net lifts	50	46	48	36	37	53	57	51	49	55	51	55

Table 5. —Continued.

Species	Survey year										78-89	90-99	78-99
	1990	1991	1992	1993	1994	1995[1]	1996	1997	1998	1999	Mean	Mean	Mean
Walleye	23.8	95.9	37.7	39.2	53.0	26.2	52.0	30.2	34.8	38.0	42.3	43.1	42.6
Smallmouth bass	0.1	0.2	0.1	0.2	0.8	2.2	2.1	1.2	1.9	1.9	0.1	1.1	0.5
Yellow perch	41.7	94.6	35.0	50.2	23.2	10.3	36.6	30.7	33.3	61.0	254.6	41.5	157.7
Rock bass	0.3	0.8	0.5	1.2	1.0	4.1	1.1	0.9	1.0	2.8	1.2	1.4	1.3
White bass	0.9	1.6	0.5	0.1	1.1	2.1	0.6	2.6	1.3	4.6	3.9	1.5	2.8
White perch	40.5	56.8	5.1	0.0	14.7	72.8	5.9	10.2	8.7	79.4	40.0	29.4	35.2
Pumpkinseed	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Bluegill	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Black crappie	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1
Channel catfish	9.0	6.0	4.6	4.6	5.4	3.7	8.8	4.4	11.4	16.0	5.5	7.4	6.3
Brown bullhead	13.1	4.3	4.0	1.6	1.1	0.2	1.1	0.4	0.0	1.0	2.7	2.7	2.7
White sucker	4.3	13.5	14.6	9.0	5.8	7.4	14.0	4.7	15.0	6.0	10.1	9.4	9.8
Redhorse sp.	0.4	0.6	3.1	3.6	1.8	1.0	5.5	1.9	3.3	2.2	1.3	2.3	1.8
Freshwater drum	5.1	25.6	8.9	20.7	8.8	13.0	15.4	6.8	28.3	50.4	25.8	18.3	22.4
Common carp	2.3	2.3	1.3	1.4	3.7	2.9	8.2	0.6	3.1	8.0	6.7	3.4	5.2
Goldfish	0.1	0.1	0.1	0.0	4.4	0.1	0.5	0.1	0.0	0.1	1.0	0.5	0.8
Gizzard shad	2.3	0.0	0.6	0.3	0.3	1.7	0.3	0.0	0.0	0.2	9.9	0.6	5.6
Longnose gar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bowfin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quillback	1.9	2.9	4.4	3.2	4.6	6.7	8.9	2.2	7.9	8.5	3.7	5.1	4.3
Stonecat	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	145.8	305.5	120.5	135.2	129.6	155.2	161.2	96.9	150.0	280.3	409.0	167.8	299.4
% yellow perch	28.6	31.0	29.0	37.1	17.9	6.2	22.7	31.7	22.2	21.8	55.2	24.8	41.4
% white perch	27.8	18.6	4.2	0.0	11.3	46.9	3.6	10.5	5.8	28.3	11.1	15.7	13.2
Net lifts	82	29	55	40	45	39	45	57	44	45	49	48	49

[1]Sampling period delayed two weeks.

Table 6.—Walleye CPUE (number per net lift) in multi-filament gill nets during fall surveys on Michigan waters of Lake Erie.

Year class	Total CPUE	Survey year																	
		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1973	1.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1974	13.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1975	42.8	0.5	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1976	18.4	1.5	0.3	0.0	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1977	171.0	5.0	2.5	3.0	0.5	0.3	–	–	–	–	–	–	–	–	–	–	–	–	–
1978	61.6	5.5	2.5	1.8	0.5	1.3	–	–	–	–	–	–	–	–	–	–	–	–	–
1979	72.4	5.0	4.3	2.3	2.0	0.5	0.5	0.3	–	–	–	–	–	–	–	–	–	–	–
1980	92.7	21.5	14.5	5.0	5.3	2.3	0.5	0.3	0.0	0.3	–	–	–	–	–	–	–	–	–
1981	72.3	33.5	21.3	7.8	3.8	2.8	2.3	0.5	0.3	0.0	–	–	–	–	–	–	–	–	–
1982	306.2	–	29.0	91.8	95.8	44.3	28.5	5.3	7.5	3.5	0.5	–	–	–	–	–	–	–	–
1983	34.6	–	–	4.5	12.0	4.0	5.0	3.5	1.8	1.8	2.0	–	–	–	–	–	–	–	–
1984	147.7	–	–	–	69.8	34.3	20.5	3.5	8.0	8.3	2.0	0.5	0.3	0.5	–	–	–	–	–
1985	177.2	–	–	–	–	98.0	42.5	9.3	14.3	8.5	1.5	1.3	0.8	1.0	–	–	–	–	–
1986	297.5	–	–	–	–	–	96.8	30.3	90.3	43.5	19.5	11.0	3.8	2.0	0.3	–	–	–	–
1987	127.8	–	–	–	–	–	–	4.5	53.8	26.8	20.0	13.8	2.5	3.8	1.0	0.5	0.8	–	0.3
1988	125.0	–	–	–	–	–	–	–	61.5	35.8	9.3	7.3	4.5	4.5	0.5	0.8	0.8	–	–
1989	52.6	–	–	–	–	–	–	–	–	16.0	17.0	10.0	2.8	3.3	1.3	0.8	0.8	0.3	0.3
1990	136.4	–	–	–	–	–	–	–	–	–	54.5	48.0	13.0	16.5	1.5	1.3	1.3	0.0	0.3
1991	194.3	–	–	–	–	–	–	–	–	–	–	63.0	47.3	61.5	11.3	6.8	2.8	1.3	0.3
1992	16.4	–	–	–	–	–	–	–	–	–	–	–	2.0	7.3	2.0	0.3	1.5	2.3	1.0
1993	168.9	–	–	–	–	–	–	–	–	–	–	–	–	73.3	71.0	11.8	8.08	3.3	1.5
1994	127.9	–	–	–	–	–	–	–	–	–	–	–	–	–	63.3	43.0	14.0	4.8	2.8
1995	6.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.3	1.3	0.8	1.0
1996	152.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	37.5	84.3	30.5
1997	88.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	54.3	34.3
1998	26.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	26.0
Total		72.5	74.9	116.2	190.2	187.8	196.6	57.5	237.5	144.5	126.3	154.9	77.0	173.7	152.2	68.6	68.8	151.4	98.3
Net lifts		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4


DNR